

WHAT IS CLAIMED IS:

1. An air brake system comprising:
  - a) a source of fresh air communicating with a desiccant wheel, wherein said desiccant wheel comprises an axis of rotation, a radius perpendicular to said axis of rotation extending from said axis of rotation to an outer circumference, and two sides, and wherein said two sides are divided into at least two sectors, and wherein said sectors comprise at least an adsorption sector and a regeneration sector, wherein said fresh air passes through said adsorption sector to be dried and wherein said air brake system further comprises;
  - b) an air compressor wherein said dried fresh air is compressed to a desired level; and
  - c) a source of heated gas sent to said regeneration sector wherein water is removed from said desiccant wheel.
2. The air brake system of claim 1 wherein said desiccant wheel further comprises a cooling sector, wherein a flow of air that is cooler than said heated air is in communication with said cooling sector.
3. The air brake system of claim 1 wherein said regeneration air is heated by said compressed air.
4. The air brake system of claim 1 wherein water from said air flow is removed by a condenser prior to removal by said desiccant wheel.
5. The air brake system of claim 1 wherein a portion of said dried air is diverted to cool a cooling sector of said desiccant wheel.

6. An air brake dryer for a braking assembly comprising:
- a) a desiccant wheel comprising an axis of rotation, a radius perpendicular to said axis of rotation extending from said axis of rotation to an outer circumference, and two faces, wherein said two faces are each divided into at least two sectors, said sectors comprising an adsorption sector and a regeneration sector, wherein said adsorption sector is contacted with a moist flow of air that passes through said adsorption sector in a direction parallel to said axis of rotation, and wherein said adsorption sector comprises an adsorbent material to remove water from said air to produce dry air; and
- b) a source of heated air in communication with said regeneration sector to remove water from said regeneration sector of said desiccant wheel, wherein said dry air passes to an air compressor that compresses said dry air to a desired pressure level.
7. The air brake dryer of claim 6 wherein said desiccant wheel further comprises a cooling sector, wherein a flow of air that is cooler than said heated air is in communication with said cooling sector.
8. The air brake dryer of claim 6 wherein said regeneration air is heated by said compressed air.
9. The air brake dryer of claim 6 wherein a portion of said water is removed from said flow of air by a condenser prior to further drying of said flow of air by said desiccant wheel.

10. The air brake dryer of claim 6 wherein a portion of said dried air is diverted to cool a cooling sector of said desiccant wheel.

11. A process for producing dry compressed air for a vehicle's air brakes comprising:

- 5 a) sending a flow of air to a vehicle air inlet;
- b) then sending said flow of air through an adsorption sector of a desiccant wheel to produce a dry flow of air;
- c) then sending said dry flow of air to an air compressor to produce a supply of compressed air; and
- 10 d) storing said supply of compressed air for use in applying said vehicle's air brakes.

12. The process of claim 11 further comprising sending a heated flow of air through a regeneration sector of said desiccant wheel to remove adsorbed water.

13. The process of claim 11 wherein said heated flow of air receives its heat from  
15 said air compressor.

14. The process of claim 11 wherein a flow of air cooler than said heated flow of air is sent through a cooling sector of said desiccant wheel prior to said flow of air contacting said adsorption sector.